Name:

## at1117paper: Complete the Square (v318)

### Example

A square's edge length is $x$ feet. A rectangle has a height of $x$ feet and a width of 36 feet. Their combined area, found by adding the square's area and the rectangle's area, is 405 square feet. What is the value of $x$?

**Example's Solution**

$$x^2 + 36x = 405$$

To complete the square, add $\left(\frac{36}{2}\right)^2 = 324$ to both sides.

$$x^2 + 36x + 324 = 729$$

Recognize the left side is now a perfect-square trinomial. Factor the left side.

$$(x + 18)^2 = 729$$

Undo the squaring.

$$x + 18 = \pm\sqrt{729}$$

$$x + 18 = \pm 27$$

Subtract 18 from both sides.

$$x = -18 \pm 27$$

In this geometric example, we are only concerned about the positive solution. So,

$$x = 9$$

### Question 1

A square's edge length is $x$ feet. A rectangle has a height of $x$ feet and a width of 30 feet. The total area, of the square and rectangle, is 559 square feet. What is the value of $x$?

$$x^2 + 30x = 559$$

$$x^2 + 30x + 225 = 784$$

$$(x + 15)^2 = 784$$

$$x + 15 = \pm 28$$

$$x = 13$$

## Question 2

A square's edge length is $x$ feet. A rectangle has a height of $x$ feet and a width of 34 feet. The total area, of the square and rectangle, is 552 square feet. What is the value of $x$?

$$x^2 + 34x = 552$$
$$x^2 + 34x + 289 = 841$$
$$(x + 17)^2 = 841$$
$$x + 17 = \pm 29$$
$$x = 12$$

## Question 3

A square's edge length is $x$ feet. A rectangle has a height of $x$ feet and a width of 56 feet. The total area, of the square and rectangle, is 2241 square feet. What is the value of $x$?

$$x^2 + 56x = 2241$$
$$x^2 + 56x + 784 = 3025$$
$$(x + 28)^2 = 3025$$
$$x + 28 = \pm 55$$
$$x = 27$$